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A low-loss four-channel microstrip diplexer for wideband multi-service wireless applications

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Abstract

In this work, a new quad-band microstrip diplexer is designed and fabricated. It consists of two bandpass filters (BPFs) coupled to a U-shape junction. The proposed resonator is a novel stub-loaded U-shape structure. The design process is based on proposing and analysing an approximated *LC* model of the presented resonator so that the design method gives general information about resonator performance. Based on this information, our diplexer is optimized to have a good performance. Our diplexer resonance frequencies are tuned at 1.8GHz, 2.45GHz, 3.5GHz and 5.2GHz. The proposed diplexer has four wide fractional bandwidths (FBWs) of 13%, 17.3%, 18.9% and 17.7%, which are the widest FBWs compared to the previously reported four-channel diplexers. Therefore, it is suitable for multi-service wideband applications. Moreover, it has high selectivity, low losses and reasonable isolation. The fabricated diplexer is measured and a good agreement between the simulation and measurement results is obtained.